

THERAPEUTIC EXERCISE DEVICE WITH ADJUSTABLE FRAME FOR  
WHEELCHAIR USERS AND STANDARD FOUR LEGGED CHAIR USERS

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This is an improved invention of WHEELCHAIR USERS

8 EXERCISE DEVICE 6334624 Inventor Joseph Giglio

BACKGROUND OF THE INVENTION

Field of the Invention

206070" SE52400F

The present invention relates to a wheelchair users  
leg exercise device which is designed to be used at home  
10 while the user remains in the wheelchair also during a  
recovery process the said invention may be used with a  
standard four legged chair. The invention includes a frame  
having a portion which fits behind the front wheels of a  
wheelchair. The said frame is unique because it may be  
15 adjusted to suit the users legs of different legnths from  
children to adult size. The present invention has a single  
radius arm and a single shock absorbing damper for leg  
exercise resistance and is light-weight. Foot pedals are  
provided conected by a connecting rod attached to said  
20 single radius arm. Elastic bands of varius degrees of  
exercise resistance are provided for exercise resistance  
and return force for the foot pedals. The frame alone  
is also claimed as it may be used as a supporting device  
for other types of leg exercise apparatus such as bicycle  
25 type pedals that would normally be free-standing and tend  
to slide away from the wheelchair or chair user during  
use. This can be acheived with minor adaptation

Description of the prior Art

The prior art recognizes the value of exercise for all persons including the wheelchair bound. Some of the relevant prior art teachings are described in the following  
5 United States patent documents.

Walker, 3,754,547, covers an exercise device for the disabled. Fig. 3 shows a connection of the device to a wheelchair, while the detail of how the chair is connected to the device is discussed at column 5. The proposed structure for the connection is much more complex than that  
10 employed in the present invention.

Dixon, 4,550,908, provides an exercise apparatus for stroke victims. This is a powered device designed to be used at a rehabilitation center, rather than at home.

15 Lambert, 4,869,494, connects a powered exerciser to the chair via a shaft 19 so that the chair is caused to move by the motor 18.

Salkind 4,883,268 is a rowing machine for wheelchair exercisers. The device relies on rubber friction gripping  
20 members to inhibit shifting along the floor and employs a shock absorber type device 52 for the arm rower.

Kynast, 4,911,425 supports the entire chair in parallel ramps which serve to lock the chair in a position, than the ramps can be adjusted from full tilt, to level.

Miller,4,936,573 discloses a foot exerciser which does not connect to the seating of the user.

Lubie,4,946,162 uses inter-connected hydrolic cylinders so that when one leg is extended, the other is  
5 contracted in a step by step fashion.

Hix,4,949,954 interconnects movement of the arms and legs of the user.

Hess,5,279,530 uses a plurality of elastic chords to provide the resistance in a leg exerciser. Straps 70  
10 connectthe exerciser to a pad on which the person lies.  
Miller,5,308,302 is similar to Miller,4,936,573 and adds a channel on the exerciser for supporting the chair of the user.

Giglio,6,334,624, is an exercise device for the  
15 wheelchair user, though from a side view it looks somewhat similar to the present invention, however it has a multitude of welds and complex angle cuts and abutments, it is far costlier and more difficult to manufacture than the present invention and it cannot be adjusted to suit  
20 the needs of the user. Also it was not designed to use a single radius arm and single shock absorber which would eliminate a considerable amount of weight, which would be advantageous for a disabled person to position the exercise device with the wheelchair as with the present  
25 invention.

## SUMMARY OF THE INVENTION

The present invention is a leg exerciser for the wheelchair bound. The exerciser includes a main frame that is placed on the floor. The main frame consists of a two-section longitudinal center member and two end members.

The two section longitudinal center member of the main frame is designed so that it can be elongated or contracted in a telescoping manner to suit the varied legnth of users legs, and set in a fixed position by a detent pin inserted into the side of the main frame. The end member at the near end of the wheelchair fits behind the front wheels of the wheelchair and in front of the large wheels and has two retaining plates proportionately spaced for each front

wheel of the chair and would touch the wheels while the user exercises. This arrangement serves to fix the position of the wheelchair relative to the exerciser and prevents separation of the exerciser from the wheelchair while in use.

The main frame has a single radius arm attached, foot pedals are provided attached to the top of the radius arm by a connecting rod, a single shock absorber is attached between the radius arm and main frame for exercise resistance. Elastic bands are also attached between the radius arm and main frame for exercise resistance and return force for the foot pedals and radius arm.

The main frame can be a separate entity alone which can be utilized as a supporting device for pre-existing exercise apparatus that normally be free-standing.

5 A principal object of the present invention is the provision of a leg exerciser for the wheelchair bound. Another object and advantage of the present invention is the provision of leg exerciser which easily attaches to a wheelchair for use. A still further object and advantage of the invention is the provision of a device to exercise  
10 the users legs safely without kick-back while the user remains seated in the wheelchair. Another object and advantage of this invention is the provision of a connection between a leg exerciser and a wheelchair which employs the front wheels of a wheelchair by securely retaining the  
15 the exerciser to the wheelchair utilizing the exercisers end members retaining plates specifically designed for that purpose.

Another object and advantage of the invention is the provision of a leg exerciser for the wheelchair bound which  
20 gives exercise resistance to the legs of a user and eliminates kick-back by utilizing dampers. A still further object and advantage of my invention is the provision of a leg exerciser that may also be used with a basic four legged chair as the user advances in a recovery process whereas  
25 the two front legs of the basic four legged chair may be utilized for retaining the exercise device in the same manner as the front wheels of the wheel chair would be

utilized. An important object and advantage of my invention is the provision of a leg exerciser which provides foot pedals attached to a single radius arm. Another object and advantage of my invention is the provision of a leg exerciser where the foot pedals exert force against the resistance of a single shock absorber type element. A still further object and advantage of my invention is the provision of a leg exerciser for the disabled that is light in weight.

Another important object and advantage of my invention is the provision of a leg exerciser for the disabled that may be adjusted to suit the length of the users legs.

An important object and advantage of my invention is the provision of a leg exerciser where elastic bands of varied degrees of resistance are provided for exercise resistance and return force for foot pedals.

#### BRIEF DESCRIPTION OF THE DRAWINGS

These as well as further objects and advantages of the invention will become apparent to those skilled in the art from a review of the following detailed description of my invention, reference being made to the accompanying drawings in which:

Fig.1 is a perspective view of my invention;

Fig.2 is a perspective view of the apparatus in

Fig.1 with a wheelchair and wheelchair user in place;

Fig.3 is a side view of the apparatus in Fig. 1;

Fig.4 is a side view of a portion of the apparatus

in Fig.3 showing a front portion of the two section longitudinal center member as it is seperated;

Fig 5. is an enlarged scale cross-sectional view through the device taken along line 1-1 of Fig.3;

5 Fig.6 is a top view showing how the apparatus is set into position for exercising in relation to the front wheels of the wheelchair;

Fig.7 is a side view of the apparatus of Fig.3 shown with a scaled down basic four legged chair  
10 in position with exercise apparatus

#### DESCRIPTION OF THE PREFERRED EMBODIMENTS

As shown in Fig.2, the wheelchair user sits in the wheelchair in the normal manner. The front wheels 23 are  
15 positioned in front of the end member 4 mounted horizontally with respect to the floor. retaining plates 10 and 11 make contact with the wheelchairs front wheels 23 this arrangement serves to securely retain the exerciser to the wheelchair 1 whereas preventing the exercise device from separating from the wheelchair while the user exerts force on the  
20 foot pedals 16 and 17. End member 4 supports retaining plates 10 and 11 which are attached virtically at opposing ends of end member 4. as shown in Fig.1. A two section center member 2 and 3 is placed longitudinally between end members 4 and 5.

25 As shown in Fig.1 the two section longitudinal center member 2 and 3 supports a single radius arm 6

radius arm 6 is pivotally attached by attaching pin 25  
at pin support members 26 and 27. The radius arm 6 is also  
connected to shock absorber 18. Elastic bands 13 and 14  
are provided the elastic bands 13 and 14 are interchang-  
5 able with elastic bands 13 and 14 of varying degrees of  
exercise resistance and return force for the radius arm 6.  
Foot pedals 16 and 17 are provided to support the users  
feet the foot pedals 16 and 17 are attached to connecting  
rod 15 at opposing ends of connecting rod 15. Connecting  
10 rod 15 is attached to the top of radius arm 6 at the center  
point of connecting rod 15. as shown in Fig.1.

Also as shown in Fig.1. the invention includes a  
supporting main frame consisting of end member 4 a two  
section longitudinal center member 2 and 3 and end member 5  
15 The radius arm 6 is pivotally attached to center section 2  
The radius arm 6 is also connected to shock absorber 18  
at attachment member 28. Elastic band posts 19 and 20 is  
a single rod that goes straight through attachment member  
28 this arrangement serves to pivotally connect shock  
20 absorber 18 with radius arm 6. Elastic band posts 19 and  
20 support elastic bands 13 and 14 which in turn elastic  
bands 13 and 14 are also support at the frame by support  
post tower 7 and support posts 8 and 9.

As is further shown in Fig.1, the two section center  
25 member 2 and 3 is a supporting member that may be adjusted  
to suit the users leg length, this is achieved utilizing



a longitudinally spaced series of transverse circular holes 21 formed through the side of section 3 of the two section longitudinal center member 2 and 3 and a detent pin 12 operatively inserted into hole 22 in Fig. 1 and a selected one of the hole 21 as shown in Fig.5 . All the holes 21 and 22 are formed clear through both opposing verticle side walls of the two section longitudinal center member 2 and 3 also as shown in Fig.5. All the sections 2,3,4,and5, are constructed of light-weight thin wall square tubing of rigid material, section 3 of the two section longitudinal center member 2 and 3 is narrower than section 2 so that it may slide inward or outward in a sleeve-like manner as shown in Fig. 4, whereas when longitudinal sections 2 and 3 are locked in a fixed position of selected legnth the foot pedals 16 and 17 will be at a chosen distance relative to the wheelchair to suit the users leg legnth.

As shown in Fig.7, this illustrates how the exercise device may be used with a basic four legged chair, whereas the front legs of the four legged chair 24 are utilized to retain the exercize apparatus in the same manner the front wheels of the wheelchair 23 as shown in Fig. 3 are utilized to retain the exercise device to the wheelchair.